Statement of Volatility – Dell Precision Workstation R7610

△ **CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

The Dell Precision Workstation R7610 contains both volatile and non-volatile (NV) components. Volatile components lose their data immediately upon removal of power from the component. Non-volatile components continue to retain their data even after the power has been removed from the component. The following NV components are present on the R7610 system board.

BIOS Configuration

The BIOS information is stored in two flash ICs, one 8 MByte and one 4 MByte. These devices are identified as U_BIOS1 and U_BIOS2 on the motherboard. These parts contain the boot code and data necessary to take the hardware from a power-off or low-power state to a state where it is ready to be managed by the operating system. No information pertaining to user applications or data is stored in these devices, however, they do store administrator and/or hard drive encryption passwords if those features are enabled by the user.

Embedded Controller

The Embedded Controller contains 256 kByte of non-volatile storage space and is identified as U_EC1 on the motherboard. The EC contains the software necessary to manage low-level control functions on the motherboard such as thermal control. No information pertaining to user applications or data is stored in the U_EC1 device.

The embedded controller also contains 8.25 kBytes of volatile memory space. The contents of this memory space are lost when power is removed from the system.

PCH CMOS

The PCH, identified as U_PCH, contains a 256 Byte battery-backed memory. This memory contains custom configuration data required by the BIOS to boot the system. It does not store passwords or other user level data. The contents of this space are lost, after several minutes, if the coin-cell battery is removed from the motherboard.

Ethernet Controller EEPROMs

The Ethernet Controller EEPROM is identified as U4 on the Rear IO motherboard. It is a 2 kbit device. The Ethernet Controller EEPROM stores driver information and the system MAC addresses. It does not store password, IP address, domain name, system ID, or similar information.

TPM 1.2 (Trusted Platform Module) Security Device

This device (identified as U_TPM) stores TPM configuration data used by the hardware and the security software offered by Dell. Encrypted user keys generated by the TPM device for use by the security software are stored in this NVM.

All other components on the motherboard will lose data once power is removed from the system. Primary power loss (unplug the power cord) will destroy all user data in the main system memory (DDR3 DIMMs) and the on-board graphics and storage interface devices.

However, the user should note that under some circumstances (for example, cold temperatures) the DDR3 DIMMs may retain their data for a significant amount of time – up to several minutes. That may potentially allow the DIMMs to be removed from one system and installed in another without loss of the data contained in them.

Secondary power loss (removing the on board coin-cell battery) will destroy system data in the PCH (platform controller hub), including time-of-day information.

There are other volatile and non-volatile components on the devices or peripherals attached to the motherboard:

> The Video Card contains volatile and non-volatile memory components. The volatile frame buffer memory will lose data once power is removed. The non-volatile memory (Video BIOS) stores only video card setup information. The video BIOS is not accessible by the user.
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> The CD-RW/Diskette Drives/DVD-R/W/Blu Ray DVD-R/W are input/output devices, whereas the DVD-ROM is an input device only. All data is processed through cache (volatile) memory. Any associated internal NVRAM is factory programmed, does not contain any user data, and is not accessible by the user.
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> The SAS and/or SATA Hard Drives and optional storage controller cards store non-volatile data. All data is processed through cache (volatile) memory. Any associated internal NVRAM is factory programmed, does not contain any user data, and is not accessible by the user. These devices may be removed.
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> The Monitor may retain "Burn-In" images after long periods of displaying static data. If any burn-in images exist, they can readily be seen using simple procedures. NV memory components are used for storing monitor calibration/configuration data & are not accessible by the user.

To help clarify memory volatility and data retention in situations where the system is put in different ACPI power states, the following information is provided regarding ACPI power states S0, S1, S3, S4 and S5:

- **S0** state is the working state where the dynamic RAM is maintained and is read/write by the processor.
- **S1** state is a low wake-up latency sleeping state. In this state, no system context is lost (CPU or chip set) and hardware maintains all system contexts.
- **S3** is called "suspend to RAM" state or stand-by mode. In this state the dynamic RAM is maintained. Dell systems will be able to go to S3 if the OS and the peripherals used in the system supports S3 state. Windows XP, Windows Vista and Windows 7 all support S3 state.
- **S4** is called "suspend to disk" state or "hibernate" mode. There is no power. In this state, the dynamic RAM is not maintained. If the system has been commanded to enter S4, the OS will write the system context to a non-volatile storage file and leave appropriate context markers. When the system is coming back to the working state, a restore file from the non-volatile storage can occur. The restore file has to be valid. Dell systems will be able to go to S4 if the OS and the peripherals support S4 state. Windows XP, Windows Vista and Windows 7 all support S4 state.
- **S5** is the "soft" off state. There is no power. The OS does not save any context to wake up the system. No data will remain in any component on the system board, i.e. cache or memory. The system will require a complete boot when awakened. Since S5 is the shut off state, coming out of S5 requires power on which clears all registers.

The Precision workstation R7610 supports all of the above states, except S1.